Dell™ PowerEdge™ 100 and 110 Appliances and
PowerEdge™ 350 Systems

RACK INSTALLATION GUIDE

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Safety Instructions

Use the following safety guidelines to ensure your own personal safety and to help protect your server, storage system, or appliance from potential damage. For complete safety, regulatory, and warranty information, refer to your system's *System Information* document.

Notes, Notices, Cautions, and Warnings

Throughout this guide, blocks of text may be accompanied by an icon and printed in bold type or in italic type. These blocks are notes, notices, cautions, and warnings, and they are used as follows:

NOTE: A NOTE indicates important information that helps you make better use of your computer system.

NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

CAUTION: A CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

WARNING: A WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious bodily injury.

Precautions for Rack-Mountable Products

Observe the following precautions for rack stability and safety. Also refer to the rack installation documentation accompanying the system and the rack for specific warning and/or caution statements and procedures.

Servers, storage systems, and appliances are considered to be components in a rack. Thus, "component" refers to any server, storage system, or appliance, as well as to various peripherals or supporting hardware.

WARNING: Installing Dell system components in a Dell rack without the front and side stabilizers installed could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizers before installing components in the rack.

After installing system/components in a rack, never pull more than one component out of the rack on its slide assemblies at one time. The weight of more than one extended component could cause the rack to tip over and injure someone.

NOTE: Dell's servers, storage systems, and appliances are certified as components for use in Dell's rack cabinet using the Dell customer rack kit. The final installation of Dell systems and rack kits in any other brand of rack cabinet has not been approved by any safety agencies. It is the customer's responsibility to have the final combination of Dell systems and rack kits for use in other brands of rack cabinets evaluated for suitability by a certified safety agency.

- System rack kits are intended to be installed in a Dell rack by trained service technicians. If you install the kit in any other rack, be sure that the rack meets the specifications of a Dell rack.
- Do not move large racks by yourself. Due to the height and weight of the rack, Dell recommends a minimum of two people to accomplish this task.
- Before working on the rack, make sure that the stabilizers are secure to the rack, extend to the floor, and that the full weight of the rack rests on the floor. Install front and side stabilizers on a single rack or front stabilizers for joined multiple racks before working on the rack.
- Always load the rack from the bottom up, and load the heaviest item in the rack first.
- Make sure that the rack is level and stable before extending a component from the rack.
- Use caution when pressing the component rail release latches and sliding a component into or out of a rack; the slide rails can pinch your fingers.
- After a component is inserted into the rack, carefully extend the rail into a locking position, and then slide the component into the rack.
- Do not overload the AC supply branch circuit that provides power to the rack. The total rack load should not exceed 80 percent of the branch circuit rating.
- Ensure that proper airflow is provided to components in the rack.
- Do not step on or stand on any system/component when servicing other systems/components in a rack.

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Dell™ PowerApp™ 100 and 110 Appliances and PowerEdge™ 350 Systems — Rack Installation Guide

This installation guide provides instructions for trained service technicians installing one or more Dell PowerApp 100 or 110 or PowerEdge 350 systems in a rack. This guide includes procedures for the following three rack kits:

- Two-post center-mount
- Two-post flush-mount
- Four-post rack cabinet

One rack kit is required for each system to be installed in the rack.

Two-Post Center-Mount Rack Kit Installation

This procedure provides instructions for installing a Dell system in a two-post open-frame relay rack, such as those found in telecommunications equipment facilities. Both 3-inch and 6-inch wide two-post racks are accommodated.

The two-post open-frame relay rack must be properly secured to the floor, to the ceiling or upper wall, and where applicable, to adjacent racks, using floor and wall fasteners and bracing specified or approved by the rack manufacturer or by industry standards. See the two-post open-frame relay rack manufacturer's installation documentation for precautionary warnings and information before attempting this installation.

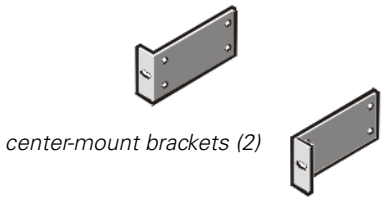
CAUTION: Do not attempt to install the system into a two-post open-frame relay rack that has not been securely anchored in place. Damage to the system and personal injury may result.

See "Safety Instructions" at the front of this document for additional safety information regarding rack installation.

Rack Kit Contents

The rack kit includes the following items (see Figure 1-1):

- Two center-mount brackets
- Four 10-24 x 0.375-inch pan-head Phillips (or slotted) screws
- Two 12-24 x 0.5-inch pan-head Phillips screws



center-mount brackets (2)

12-24 x 0.5-inch pan-head Phillips screws (2)

10-24 x 0.375-inch pan-head Phillips screws (4)

Figure 1-1. Two-Post Center-Mount Rack Kit Contents

Recommended Tools and Supplies

You need the following tools and supplies to install the system in a two-post open-frame relay rack:

- #2 Phillips screwdriver
- Masking tape or a felt-tip pen, for use in marking the mounting holes to be used

Marking the Rack

1. Determine where you want to place the bottom of the system.

CAUTION: If you are installing more than one system, install the first system in the lowest available position in the rack.

2. Mark the upper and lower-mounting positions on the two posts.

   Each 1-U (1.75-inch) vertical space has three holes, with center-to-center spacing between holes (beginning at the center of the top hole of a 1-U space) of 0.625, 0.625, and 0.5 inch (see Figure 1-2).

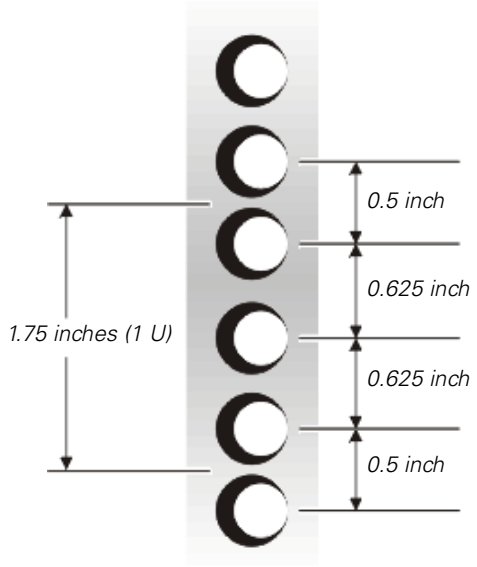


Figure 1-2. Two-Post Open-Frame Relay Rack 1-U Hole Spacing

Attaching the Brackets

1. Locate one of the two brackets and align it over the two threaded holes on the side of the system (see Figure 1-3).

2. Secure the bracket to the system chassis using two 10-24 x 0.375-inch screws (see Figure 1-3).

   Repeat this step to install the remaining bracket on the other side of the system.

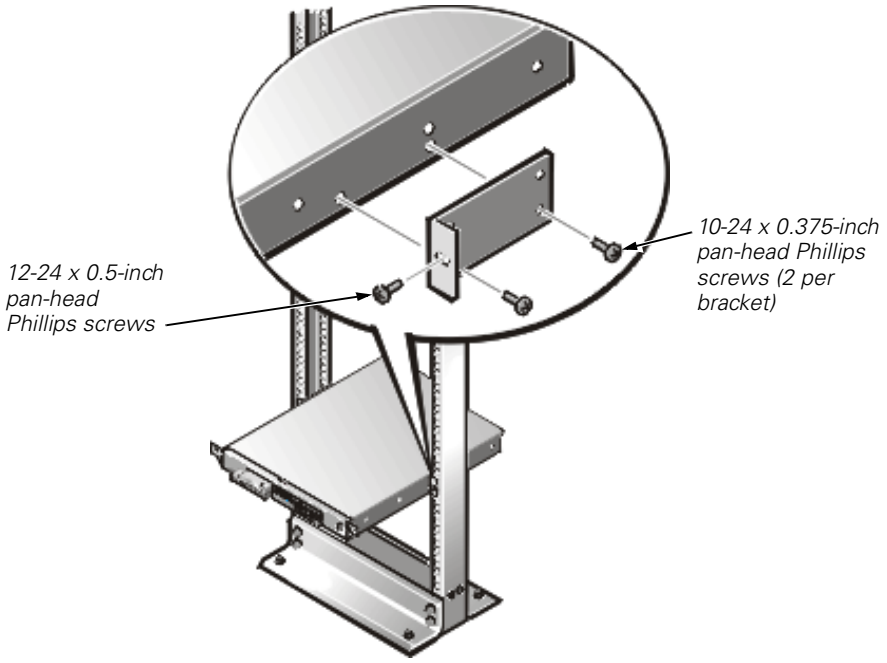


Figure 1-3. Securing the System in the Rack

Installing the System in the Rack

CAUTION: Due to the size and weight of the system, never attempt to install the system by yourself.

1. Lift the system into position between the two posts, with the hole in the mounting bracket aligned one hole above the mark you made in the two posts.

2. Secure the system to the rack using a 12-24 x 0.5-inch screw through the mounting bracket to the front of the left and right posts (see Figure 1-3).

3. Attach the front bezel, if it is not already attached, to the system (see the *Installation and Troubleshooting Guide* for instructions).

   This completes the two-post center-mount rack installation.

Two-Post Flush-Mount Rack Kit Installation

This procedure provides instructions for installing a Dell system in a two-post open-frame relay rack, such as those found in telecommunications equipment facilities. Both 3-inch and 6-inch wide 2-post racks are accommodated.

The two-post open-frame relay rack must be properly secured to the floor, to the ceiling or upper wall, and where applicable, to adjacent racks, using floor and wall fasteners and bracing specified or approved by the rack manufacturer or by industry standards. Refer to the two-post open-frame relay rack manufacturer's installation documentation for precautionary warnings and information before attempting this installation.

CAUTION: Do not attempt to install the system into a two-post open-frame relay rack that has not been securely anchored in place. Damage to the system and personal injury may result.

See "Safety Instructions" found earlier in this guide for additional safety information regarding rack installation.

Rack Kit Contents

The two-post flush-mount rack kit includes the following items (see Figure 1-4):

- Two flush-mount brackets
- Two inner mounting rails
- Four 12-24 x 0.5-inch pan-head Phillips (or slotted) screws
- Four 10-24 x 0.25-inch flat-head slotted screws for securing the inner mounting rails to the sides of the system
- One 1-U template

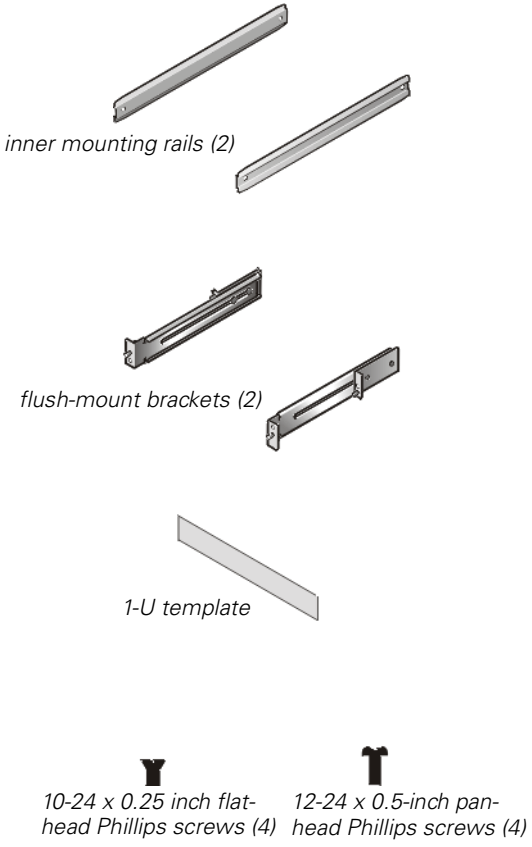


Figure 1-4. Two-Post Flush-Mount Rack Kit Contents

Recommended Tools and Supplies

You need the following tools and supplies to install the system in a two-post open-frame relay rack:

- #2 Phillips screwdriver
- Masking tape or a felt-tip pen, for use in marking the mounting holes to be used

Marking the Rack

1. Determine where you want to place the bottom of the system.

CAUTION: If you are installing more than one system, install the first system in the lowest available position in the rack.

2. Place the 1-U template over the front of the two-posts of the rack in the desired location.

3. Position the bottom of the template in line with the desired bottom position of the system chassis.

4. Mark the upper and lower-mounting positions on the vertical rails as shown by the V-notches on the sides of the template.

   Each 1-U (1.75-inch) vertical space has three holes, with center-to-center spacing between holes (beginning at the center of the top hole of a 1-U space) of 0.625, 0.625, and 0.5 inch (see Figure 1-5).

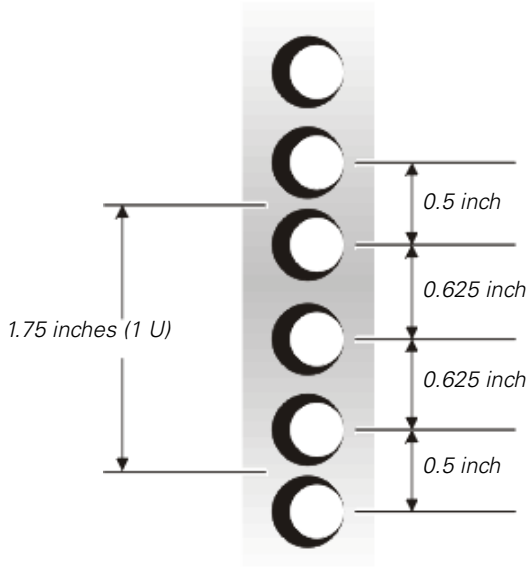


Figure 1-5. Two-Post Open-Frame Relay Rack 1-U Hole Spacing

Installing the Bracket in the Rack

CAUTION: The 1-U mounting bracket is designed to support a single system. Do not attempt to install any other system in this bracket. Damage to the system and personal injury may result.

CAUTION: Due to the size and weight of the system, never attempt to install the system by yourself.

1. Slide the back portion of the bracket to its widest opening and place the mounting bracket into the rack, with the bottom of the bracket at the marks you made earlier (see Figure 1-6).

2. Slide the back part of the bracket toward the front, with the pins entering the lower screw holes in the rack, at the marks you made earlier. Secure the bracket front and back to the rack with a 12-24 x 0.5-inch screw.

   Repeat this step to install the remaining bracket on the other side of the rack.

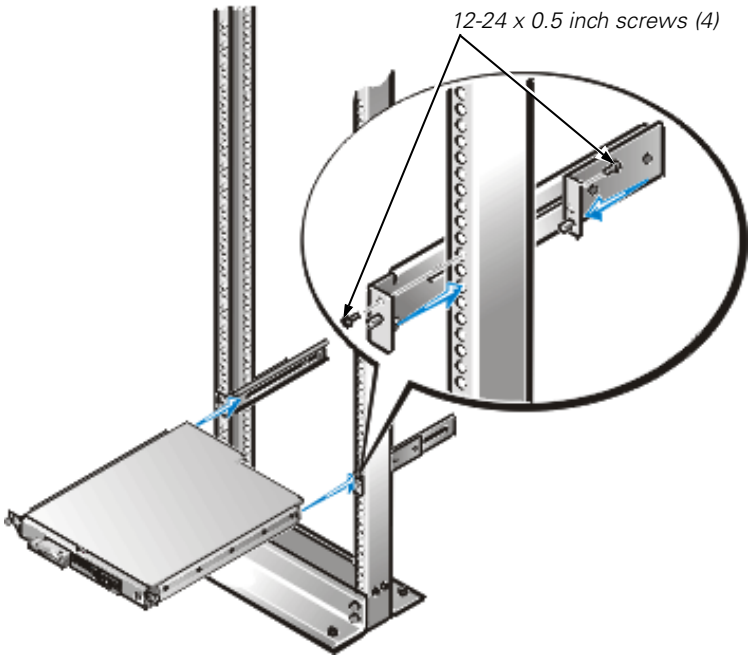


Figure 1-6. Installing the Bracket in the Rack

Installing the Inner Rails on the System Chassis

1. Locate the two inner rails and position one to the side of the chassis (see Figure 1-7).

   Ensure that the flat end of the inside rail is toward the front of the chassis and that the end with two threaded holes is located at the back of the chassis. The flat central part of the inside rail must be facing the chassis, with the raised upper and lower rail surface facing outward (see Figure 1-7).

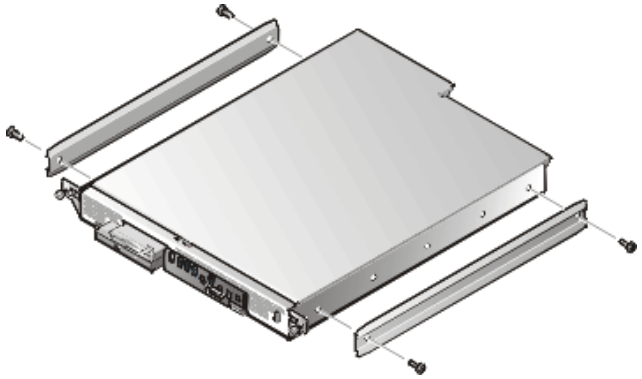


Figure 1-7. Securing the Inner Rails to the System Chassis

2. Secure each inner rail to the chassis using two 10-32 x 0.25-inch flat-head screws.

Installing the System in the Rack

CAUTION: Due to the size and weight of the system, never attempt to install the system by yourself.

1. Remove the optional bezel from the system front panel. Press the tab on each end of the bezel and pull the bezel straight out from the chassis.

2. Lift the system into position in front of the installed mounting bracket.

3. Move the system back with its inside rail engaging the mounting bracket. Slide the system completely into position and secure it to the rack using the captive fasteners at the outer edge of the front panel (see Figure 1-8).

   An internally threaded stud projecting from the front of the tray flanges accepts the captive fastener on the front of the system.

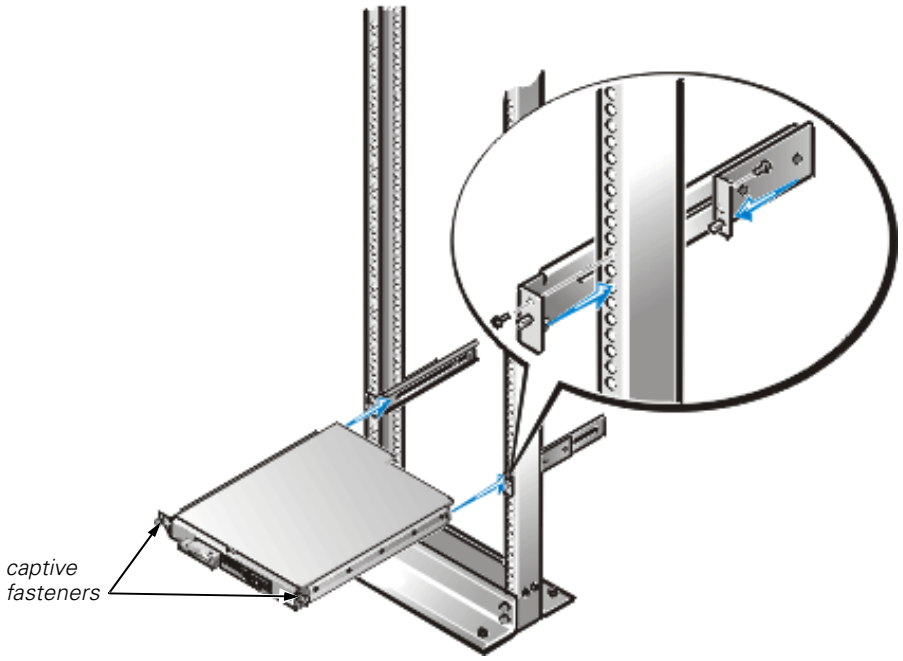


Figure 1-8. Securing the System in the Rack

4. Attach the front bezel, if it was removed in step 1, to the system (see the *Installation and Troubleshooting Guide* for instructions).

Installing Tab Covers

CAUTION: The system's two-post flush-mount slide assembly does not have a safety stop. Use care when sliding the system in and out of the rack; the system could fall out of the rack, possibly resulting in bodily injury and damage to the system.

1. Push the system completely into the rack.

2. Center the thumbscrew on the tab cover with the clearance hole on the system tab, and align the slot on the tab cover with the opening on the system tab (see Figure 1-9).

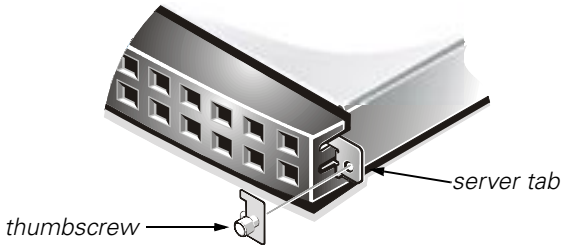


Figure 1-9. Installing the Tab Cover

3. Hold the tab cover firmly onto the server tab and engage the thumbscrew with the receiving fastener on the slide bracket.
4. Repeat steps 1 through 3 to install the tab cover on the other side of the system.

   This completes the two-post flush-mount rack installation.

Four-Post Rack Kit Installation

This procedure provides instructions for installing a Dell system in a four-post rack cabinet. Both 24-U and 42-U racks are accommodated.

Rack Kit Contents

The rack kit includes the following items (see Figure 1-10):

- One pair of slide assemblies
- One cable-management arm
- Four 10-32 x 0.5-inch pan-head Phillips screws
- Six 10-24 x 0.375-inch pan-head Phillips screws
- One 1-U template for a four-post rack

NOTE: If you purchased a Dell rack along with your system, the slide assemblies may be preinstalled in the rack.

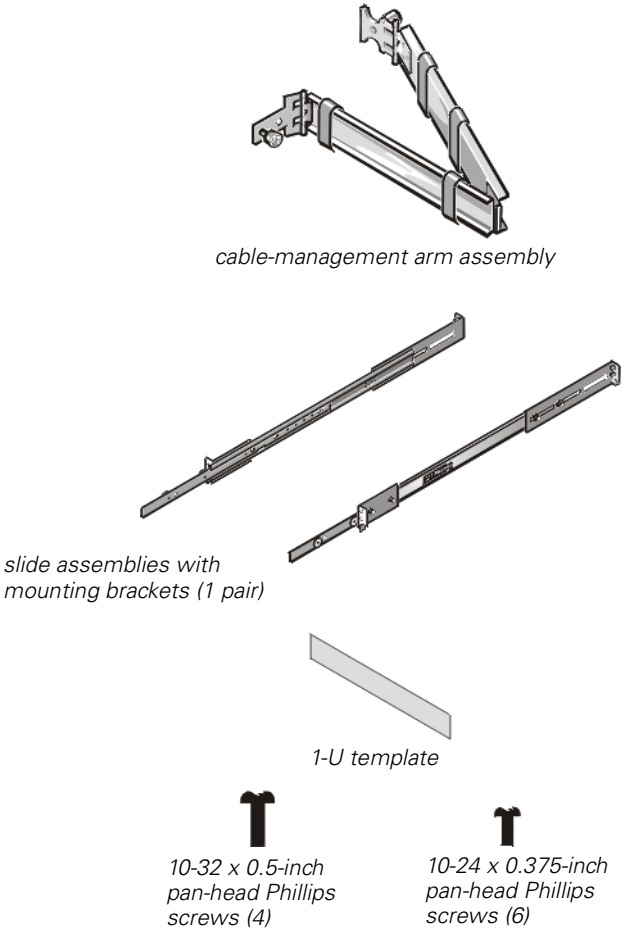


Figure 1-10. Four-Post Rack Kit Contents

Before You Begin

Before you begin installing your system in the rack, carefully read "Safety Instructions," found earlier in this guide.

NOTICE: This rack kit is intended to be installed in a Dell rack by trained service technicians. If you install the kit in any other rack, be sure that the rack meets the specifications of American National Standards Institute (ANSI)/Electronic Industries Association (EIA) standard ANSI/EIA-310-D-92, International Electrotechnical Commission (IEC) 297, and Deutsche Industrie Norm (DIN) 41494. One rack kit is required for each Dell server, storage system, or appliance that is installed in a rack.

Recommended Tools and Supplies

You need the following tools and supplies to install the system in a four-post rack cabinet:

- A #2 Phillips screwdriver
- A flat-blade screwdriver
- Masking tape or a felt-tip pen, for use in marking the mounting holes to be used

Installing the Rack Kit

NOTES: If you purchased a Dell rack along with your system, the slide assemblies may be preinstalled in the rack.

For instructions on installing the system itself, see "Installing the System in the Four-Post Rack" found later in this guide.

To install the slide assemblies in the rack, perform the following steps:

1. Remove the rack's front and back doors.
2. Install the slide assemblies in the rack.

The subsections that follow include instructions for performing these tasks.

Removing the Doors From the 42-U Rack

CAUTION: To prevent personal injury due to the size and weight of the doors, never attempt to remove the doors by yourself.

CAUTION: Store the two doors where they will not injure someone if the doors accidently fall over.

This procedure provides instructions for removing doors from earlier 42-U Dell racks. If you have a newer Dell PowerEdge 4210 rack, refer to the procedures contained in the *Dell PowerEdge 4210 Rack Installation Guide*.

1. Open the latch on the front door (see Figure 1-11).

   Slide the button cover up as far as it will go, press the push button, rotate the handle clockwise until the latch releases, and then pull the door open.

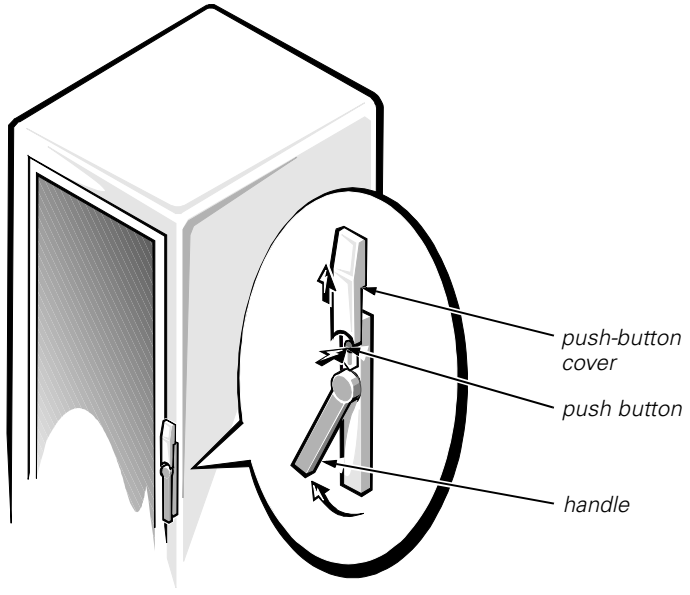


Figure 1-11. Opening the 42-U Rack Door

2. Remove the front door from the rack as shown in Figure 1-12.

   a. One person should grasp the top of the door to stabilize it. The other person should grasp the bottom of the door.

   b. The person holding the bottom of the door should press the hinge release lever on the bottom hinge and then pull the door away from the rack.

   c. The person holding the top of the door should press the hinge release lever on the top hinge and then pull the door away from the rack.

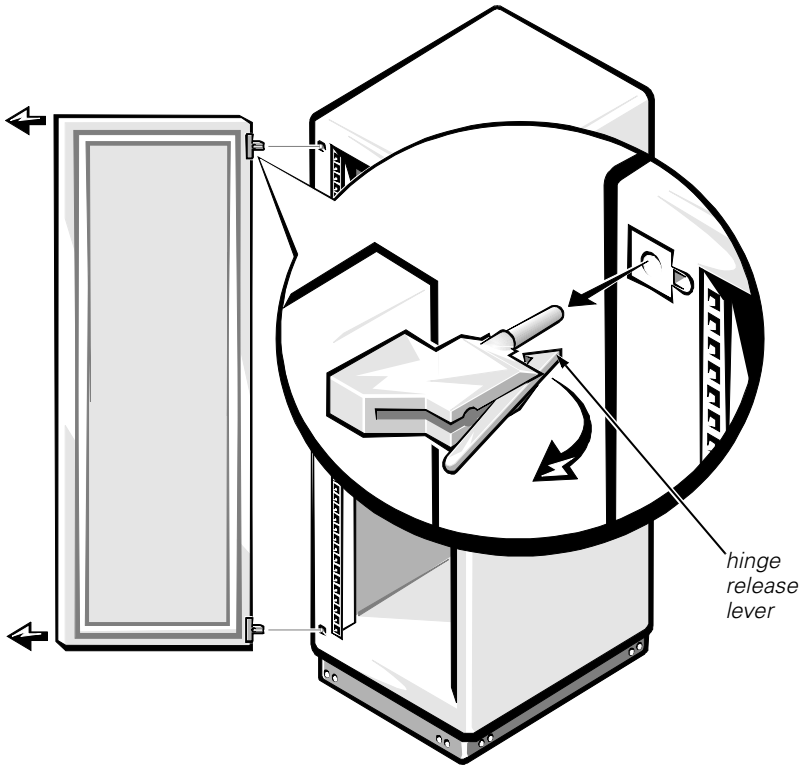


Figure 1-12. Removing the 42-U Rack Doors

3. Repeat steps 1 and 2 to remove the back door from the rack.

Removing the Doors From the 24-U Rack

CAUTION: To prevent personal injury due to the size and weight of the doors, never attempt to remove or replace the doors by yourself.

1. Unlock and twist the handle clockwise (see Figure 1-13).
2. Open the front door.

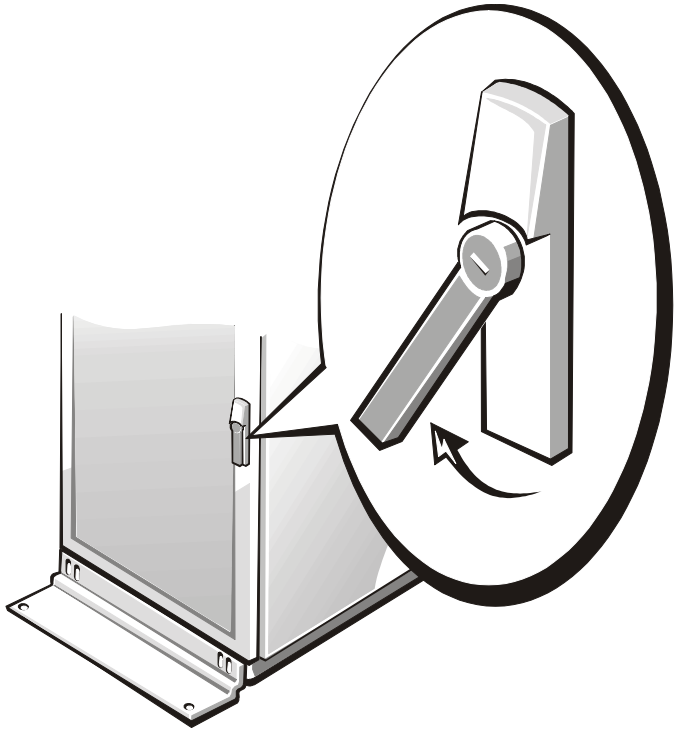


Figure 1-13. Opening the 24-U Rack Door

3. Remove the front door from the rack as shown in Figure 1-14.
   a. With the door open, lift out and fully retract all hinge pins.
   b. Once all the hinge pins have been lifted out and retracted, lift the door out.

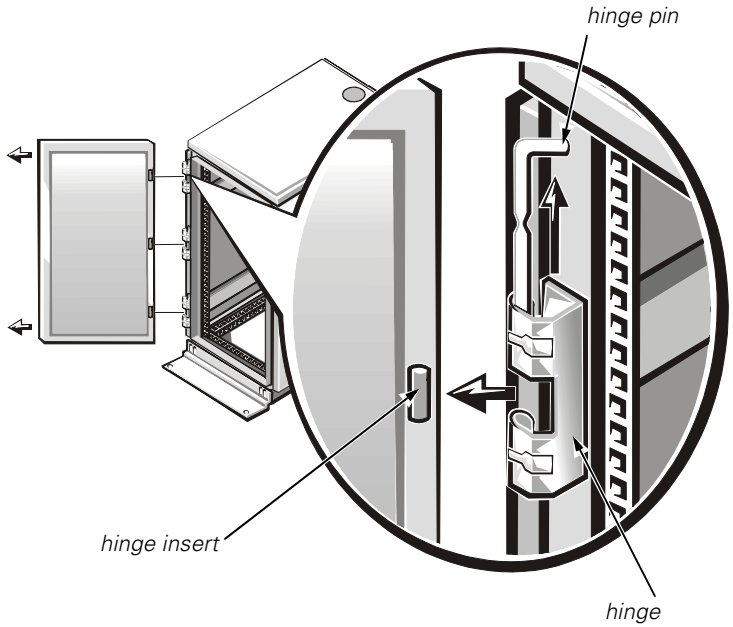


Figure 1-14. Removing the 24-U Rack Doors

CAUTION: Store the two doors where they will not injure someone if the doors accidently fall over.

If you want to reverse the door so that the handle is on the other side, perform the following steps:

1. With the door open, lift out and fully retract all hinge pins.
2. Remove the hinges and door brackets from the door frame.
3. Replace the hinges and door brackets on the opposite side and switch the position of the handle.
4. Replace the rack door (see the section, "Replacing the Rack Doors," found later in this guide).

Installing the Slide Assemblies in the Four-Post Rack

NOTE: If the slide assemblies were preinstalled by Dell, you can skip this section.

You must allow 1 U (1.75 inches) of vertical space for each system you install in the rack.

NOTE: The vertical rails of the rack are marked by small indentations in 1-U increments (see Figure 1-15).

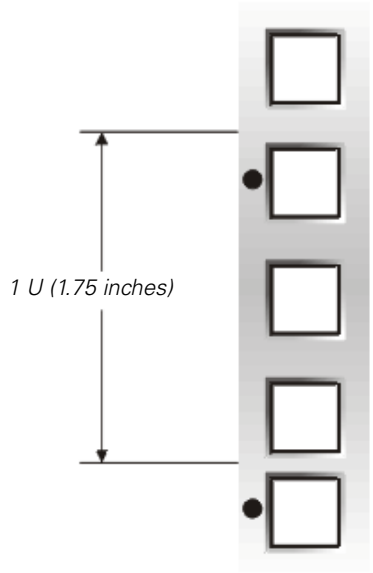


Figure 1-15. One Rack Unit

For more information about requirements for installing components in a rack, see the Dell Rack Advisor software available on the Dell World Wide Web site at **http://support.dell.com.**

WARNING: If you are installing more than one system, install the slide assemblies so that the first system is installed in the lowest available position in the rack.

To install the slide assemblies in the rack, perform the following steps:

1. Place the front of the template on the vertical rails at the front of the rack where you want to install the system.
2. Ensure that the printing on the template identifies the side facing outwards as the template front.
3. Position the bottom of the template in line with the desired bottom position of the system chassis.
4. Mark the rack's front vertical rails with a felt-tipped marker or place masking tape where the system's upper and lower edges will be located (see Figure 1-16).
5. Make a mark or place tape on the vertical rails next to the template's V-shaped notches.

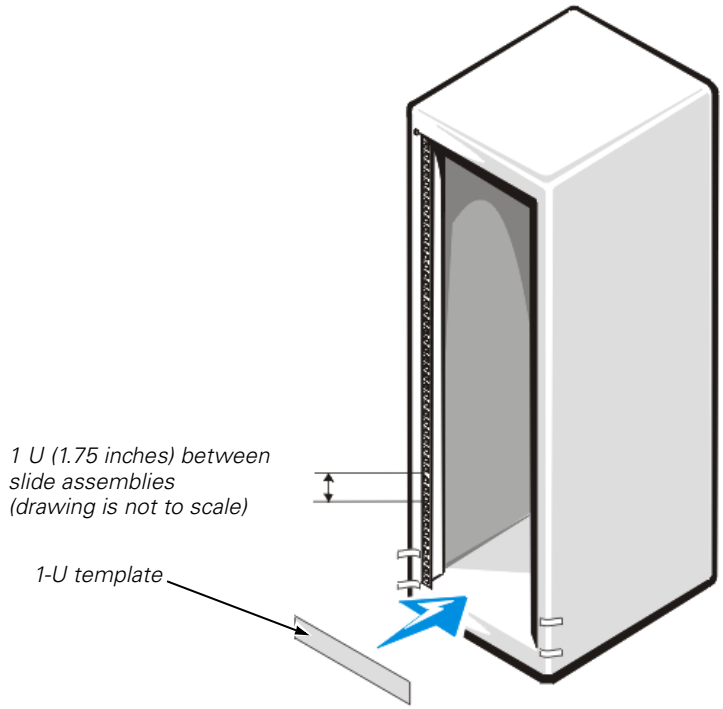


Figure 1-16. Using Template to Mark Vertical Rails

6. At the front of the rack cabinet, position one of the slide assemblies so that its mounting-bracket flange fits between the marks or tape you placed on the rack, marking the upper and lower edges of the template (see Figure 1-17).

   The hooks on the bottom of the mounting bracket should enter the holes beside the lower marks you made in the vertical rails.

7. Secure the front of the mounting-bracket flange with a 10-32 x 0.5-inch pan-head Phillips screw in the front vertical rail (see Figure 1-17).

8. Push back on the back mounting-bracket flange until the mounting hook locks into the matching square hole on the back vertical rail.

9. Repeat steps 6 through 8 for the remaining slide assembly on the other side of the rack.

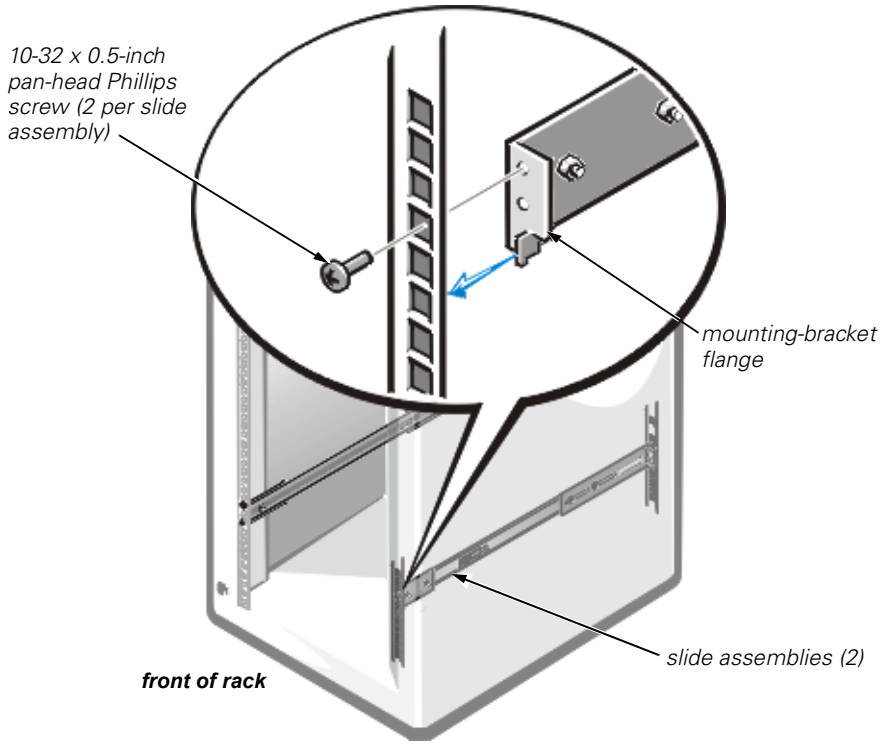


Figure 1-17. Installing the Slide Assemblies

Installing the Inner Rails on the System Chassis

To install the inner rails to the sides of the system, perform the following steps.

CAUTION: The system may weigh up to 10 kilograms (23 pounds) when fully loaded. To prevent personal injury, do not attempt to move the system by yourself.

1. Place the system on its side (see Figure 1-18) on a piece of foam or cardboard (to prevent damage to the system) while you install the inner rails to the sides of the system.

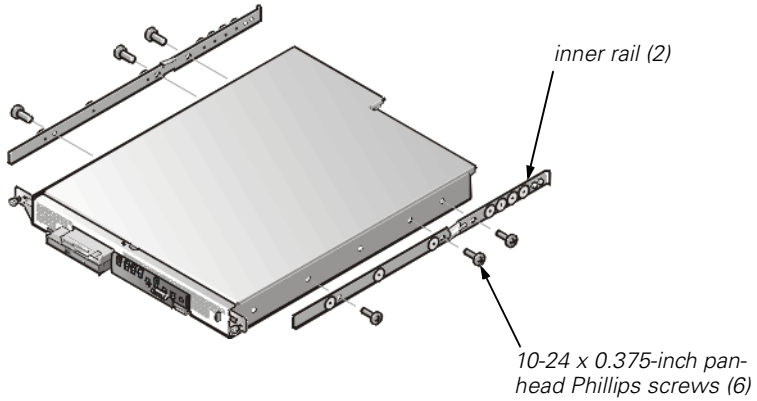


Figure 1-18. Installing the Inner Rails

2. Secure each inner rail to the side of the chassis with three 10-24 x 0.375-inch pan-head Phillips screws (see Figure 1-18).

Installing the System in the Four-Post Rack

WARNING: If you are installing more than one system, install the first system in the lowest available position in the rack.

WARNING: Never pull more than one component out of the rack at a time.

1. Pull the two interior slide assemblies out of the rack until they lock in the extended position.

CAUTION: Because of the size and weight of the system, never attempt to install the system in the slide assemblies by yourself.

2. Lift the system into position in front of the extended slides.

   Grasp the system with one hand on the right side of the system and the other hand on the left side of the system.

3. Align the inner rails you installed on the sides of the system with the open portion of the slide assemblies (see Figure 1-19).

4. Push the system into the slide assemblies until the system stops (see Figure 1-19).

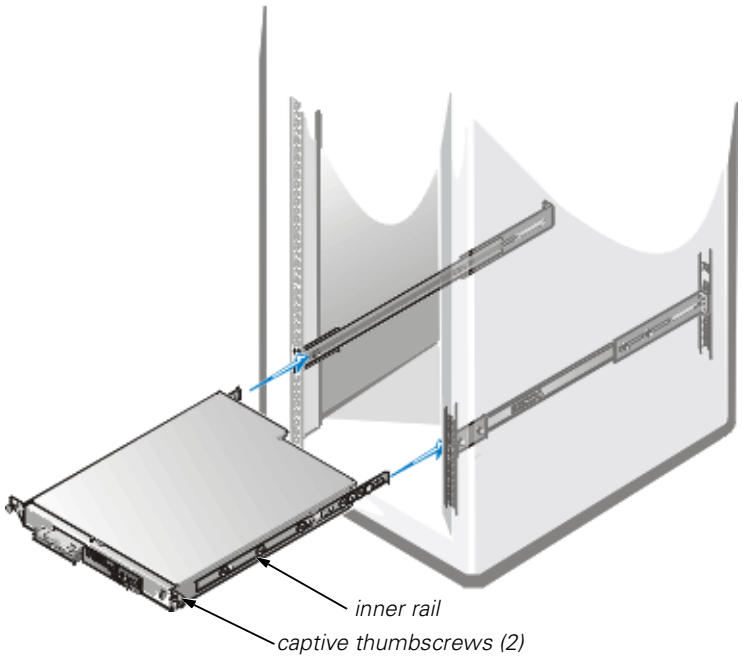


Figure 1-19. Installing the System in the Rack

5. Press in on the release latch on each extended slide and push the chassis into the rack.

6. Tighten the captive thumbscrews on each side of the front chassis panel to secure the system to the rack.

Installing the Cable-Management Arm

To install the cable-management arm on the back of the system, perform the following steps:

1. Facing the back of the rack cabinet, locate the threaded hole on the back of the slide assembly and secure the end of the cable-management arm (the end having a bracket and captive thumbscrew) to the right side vertical rail (see Figure 1-20).

   The bracket snaps into the square mounting holes on the vertical rail and is secured with a captive thumbscrew.

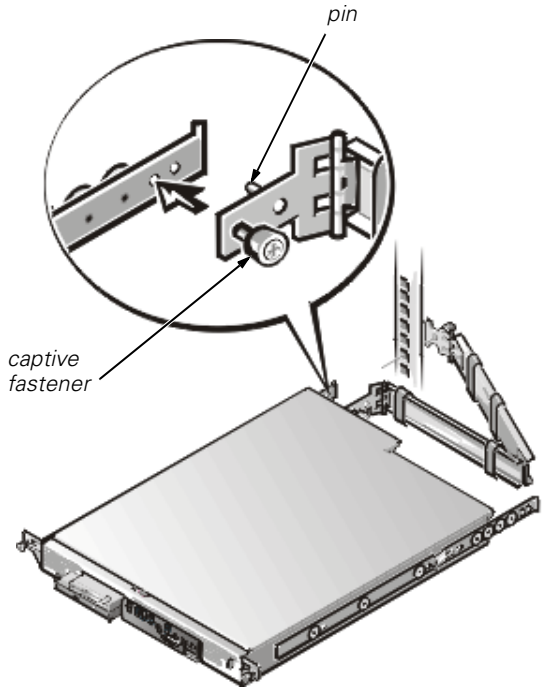


Figure 1-20. Installing the Cable-Management Arm

2. Align the free end of the cable-management arm (the end with the pin and captive thumbscrew) to the back end of the right (or left) side inner rail (as viewed from the back) of the system.

3. Secure the cable-management arm to the inner rail with the captive thumbscrew (see Figure 1-20).

4. Attach the input/output (I/O) cables to their respective expansion cards on the back of the system.

5. Connect the remaining cables to the system.

   For details, see your system's *Installation and Troubleshooting Guide* and *User's Guide*.

6. Secure the cables to the cable-management arm:

   a. After connecting the cables to the system, unscrew the thumbscrews that secure the front of the server to the front vertical rail.

   b. Slide the system forward to the fully extended position.

   c. Route the cables along the cable-management arm, allowing some additional cable slack at the hinge positions, and secure the cables to the cable-management arm with the Velcro straps attached to the cable-management arm.

7. Slide the system in and out of the rack to verify that the cables are routed correctly and do not bind, stretch, or pinch with the movement of the cable-management arm.

NOTE: As you pull the system out to its furthest extension, the slide assemblies will lock in the extended position. To push the system back into the rack, press the locking latch on the side of the slide to release the locks, and then slide the system completely into the rack.

Replacing the Rack Doors

The following subsections describe procedures for replacing the rack doors on earlier Dell 42-U and 24-U racks. If you have a Dell PowerEdge 4210 rack, see the procedures contained in the *Dell PowerEdge 4210 Rack Installation Guide*.

Replacing the Rack Doors on a 42-U Rack

CAUTION: To prevent personal injury due to the size and weight of the doors, never attempt to remove or replace the doors by yourself.

1. Lift the front door into position and align the hinges with the holes in the rack as shown in Figure 1-12.
2. Slide the hinges into the holes in the rack until the hinge release levers lock the hinges into position.
3. Close the door latch by rotating the handle counterclockwise until it stops, push in the handle until it locks in position, and then slide the button cover down over the push button (see Figure 1-11).
4. Repeat steps 1 through 3 to install the back door.

Replacing the Rack Doors on a 24-U Rack

CAUTION: To prevent personal injury due to the size and weight of the doors, never attempt to remove or replace the doors by yourself.

1. Lift the front door into position and align the hinges with the holes in the rack (see Figure 1-14).
2. Line up the door hinges and then press them down.
3. Close the door latch by rotating the handle counterclockwise until it stops, and then push the handle in until it locks in position (see Figure 1-13).
4. Repeat steps 1 through 3 to install the back door.

This completes the four-post rack kit installation.

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